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ABSTRACT

Flexibility and creativity in the language of deaf children were investigated by requesting four deaf and four hearing youths to generate stories on themes supplied by an experimenter. One theme concerned finding a new civilization in the center of the earth; the other centered on awakening one day to discover that animals and people had changed roles. Children's storytelling behavior was videotaped and examined for instances of nonliteral communication. Analyses indicated that, in addition to the traditional categories of novel and frozen tropes, both deaf and hearing students' stories contained four other types of creative language devices: gesture, pantomime, linguistic modification, and linguistic invention. Contrary to previous claims that deaf children are extremely rigid and literal in their language use, deaf subjects showed considerable nonliteral language use when evaluated in sign rather than vocal language. It was found that deaf students produced traditional types of figurative constructions at a rate equal to that of their hearing age-mates and surpassed hearing students in the four other categories. These findings are discussed in terms of cognitive skills required for and reflected by figurative language use and are related to common assumptions about the associated abilities of deaf children. (Author/RH)

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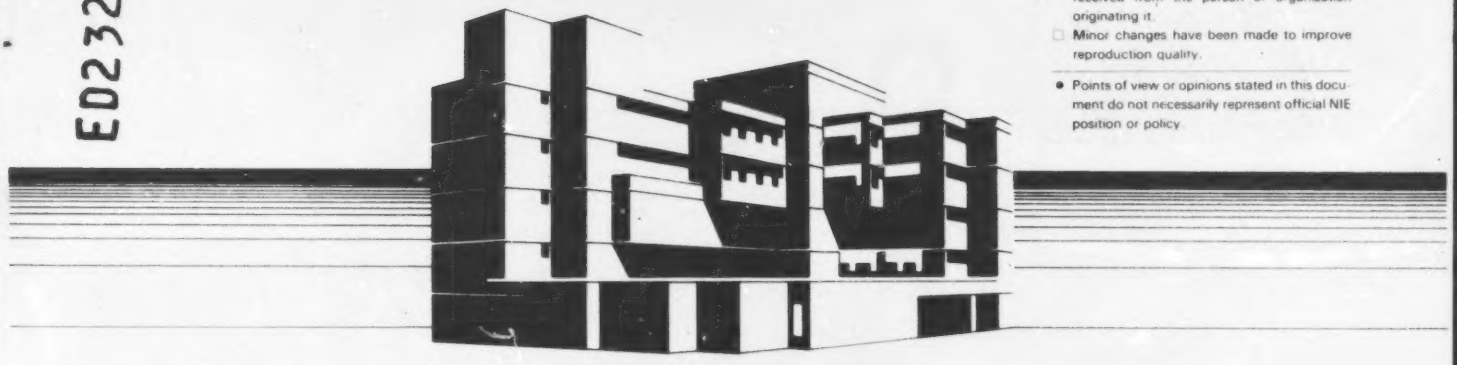

CREATIVE LANGUAGE ABILITIES OF DEAF CHILDREN

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Abstract

The language flexibility and creativity of deaf children was investigated by having four deaf and four hearing 12-15 year olds generate stories to experimenter-supplied themes. These were videotaped and examined for instances of non-literal communication. In addition to the traditional categories of novel and frozen trope, both the deaf and hearing students' stories contained four other types of creative language device. Contrary to previous claims that deaf children are extremely rigid and literal in their language use, subjects here showed considerable, non-literal language when evaluated in sign rather than vocal language. Under these conditions, deaf students produced traditional types of figurative contructions at a rate equal to their hearing age-mates and surpassed them in the four other categories. These findings are discussed in terms of the cognitive skills required for and reflected by figurative language use, and common assumptions concerning deaf children's related abilities.

Although deaf children's nonverbal intellectual abilities have been shown comparable to those of their hearing age-mates, they lag behind in a variety of linguistic and cognitive skills (Conrad, 1979; Furth, 1966, 1973; Liben, 1978; Watts, 1979). This usually is attributed to the deaf child's relatively concrete level of psychological functioning (Conrad, 1979; Furth, 1973). Their inability to progress beyond that level is assumed due to linguistic deficits that hamper more sophisticated (abstractive) interactions with educational and social environments (Liben, 1978; Watts, 1979). Many of the complex skills demanded of deaf children, however, are both learned and tested through English-based (especially printed) media.(1) Deaf children, in fact, may have linguistic and cognitive abilities just as flexible as their hearing age-mates, but not easily adaptable to training and assessment in English. In particular, the deaf child's ability to consolidate and/or communicate new information may depend on different kinds of descriptive devices than the hearing child (Tomlinson-Keasey, 1978).

One means of evaluating this possibility is the investigation of creative, non-literal language production by deaf children. The apparent importance of figurative language as a learning device, assessment tool, and theoretically important phenomenon has resulted in a recent explosion of research in the area with hearing children as well as adults (see Billow, 1977; Marschark, Katz, & Paivio, 1983; Ortony, 1979). Most generally, figurative language evidences a link between linguistic flexibility and a more global cognitive ability to consider the world from alternative perspectives. Figurative language skills also have been shown related to standard classification tasks and concept learning in hearing children (e.g., Asch & Nerlove, 1960; Billow, 1975; Piaget, 1926). Deaf children, however, frequently are reported to have considerable difficulty grasping abstract relationships (Conrad, 1979; Furth,

1973) and conceptual categorization (Liben, 1978). Their language training (usually in residential schools) is relatively literal and concrete in both syntax and vocabulary, and they are not expected to exhibit much diversity or creativity in the linguistic realm. Consequently, most deaf children emerge from school lacking the flexible syntactic and semantic competence required to generate and understand more complex conversational and written language that often involve non-literal nuances.

While non-literal language constructions are often used to express general relations in apt and succinct ways (Ortony, 1975; Tourangeau & Sternberg, 1981; Verbrugge & McCarrell, 1977), they also can serve to concretize abstract ideas and relations that otherwise might be inexpressible (Ortony, 1975; Paivio, 1979). In fact, several researchers have suggested that this aspect of figurative language makes it one of the most basic ways of learning about the world: Its mapping of different, previously unrelated domains onto each other extends the child's previous knowledge to that which is unfamiliar, and thus is a tool as well as a skill (Arnheim, 1974; Petrie, 1979; Piaget, 1926). This could be of particular utility to the deaf child who might have less flexible linguistic (and other) combinatorial abilities than hearing age-mates (Griswold & Commings, 1974). Moreover, because of its "compactness" (Ortony, 1975), figurative language is an extremely efficient and vivid form of communication. By predicating wholistic property sets or "chunks" of information from one concept to another (as in proverbs), it reduces the need to explicitly provide all details of an intended message. Such constructions thus reduce both the processing load and the time required for information production and comprehension relative to exact, literal transmission. This also could facilitate the language functioning of deaf children who typically have vocabularies smaller than those of their hearing peers (Furth, 1973; Griswold &

Commings, 1974; Liben, 1978).

It may well be that deaf individuals have considerable linguistic flexibility within sign language, but these have not been described or investigated. The use of several figurative sign language devices in the "art-sign" of deaf adults has been described (Klima & Bellugi, 1976, 1979), but it remains unclear whether these occur as pervasively and play as central a role in sign as figurative constructions do in English (Ortony, 1975; Petrie, 1979). Several studies also have investigated the pre-lingually deaf child's figurative language comprehension abilities (e.g., Iran-Nejad et al., 1981; Conley, 1976), but virtually all of these have involved only English figurative language. Not surprisingly, that research has shown that spontaneous comprehension of such English constructions (by the deaf) is relatively poor. Conley (1976), for example, found that even when matched on reading ability, deaf students were significantly poorer than hearing students in tests of (English) figurative language comprehension. Iran-Nejad, Ortony, and Rittenhouse (1981), however, showed that much of the deaf child's difficulty with English metaphors and similes related to factors that they claimed were not directly related to metaphor comprehension itself (e.g., syntactic structure, vocabulary). While their results indicated that deaf children as young as 9 years could learn to identify figurative uses of English, the generality of those findings may be limited. The experimental setting was extremely artificial, the materials were carefully controlled in content and syntax, and a picture representing the main, tested theme of the story was provided (cf. Marschark, Note 1). Nonetheless, Iran-Nejad et al.'s findings suggest greater linguistic competence in the deaf child than evidenced by earlier findings.

It appears obvious that investigations of the deaf child's abilities within sign language would be far more informative with regard to their linguistic and cognitive flexibility than English-based studies like those noted above. Suty and Friel-Patti (1982), for example, recently showed that within a sign language (story) production task, (two) deaf children demonstrated complex linguistic skills independent of and beyond that expected on the basis of their skills in English. That report, however, gave little detail concerning the content of the stories produced, and there were no references to their concreteness, literalness, or figurativeness. The present study therefore investigated the unique cognitive-linguistic relationship in the deaf school child by examining their spontaneous use of non-literal language devices. If deaf children are as linguistically and conceptually limited as has been claimed, their use of sign language should be just as literal and concrete as their English has been shown to be (Conley, 1976; Conrad, 1979; Kaltsounis, 1970).

Method

Subjects. Four deaf students (ages 12:10, 13:1, 13:6, 15:0) attending a local residential school for the deaf and four hearing, public school students (ages 12:7, 12:8, 14:0, 14:11) participated in the study. Each group had 3 males and 1 female, all of "normal" intelligence according to school records. The four deaf subjects all had profound sensori-neural hearing losses, two from birth and two from unknown but prelingual ages. None had any other handicaps and all were enrolled in the same "total communication" program. One of the deaf subjects' father was deaf; all other parents and siblings were hearing. The two youngest (male) deaf subjects were English-fluent (i.e., had good oral and lipreading skills) and primarily used a pidgin Signed English in the language samples obtained here. One of these was the student, deaf from birth,

whose father was deaf; the other was not congenitally deaf. The other two subjects used primarily American Sign Language (ASL) in their productions and demonstrated little oral ability.

Procedure. Each student was videotaped, individually, while telling stories to two experimenter-supplied themes. One of the two experimenters was a (fluent signing) former teacher of deaf 12-18 year olds; he used both speech and sign in communicating with the deaf students. Their videotaping was done in a dormitory at their school, a common procedure in schools for the deaf. The hearing students were videotaped in the (familiar) building where their parents worked or had offices as graduate students.

Although no peers were present, both deaf and hearing subjects were told that the stories were being videotaped for younger children who needed help in "learning to tell stories." One story was about finding a new civilization in the center of the earth and the other was about awakening one day to discover that animals and people had changed roles. All subjects were told that their stories could be any length and could include anything they wanted as long as the stories related to the given themes. Production order of the two stories was counterbalanced.

Results and Discussion

Scoring. The videotapes of the deaf subjects were translated by a native signing professional interpreter (with national certification). Translations were done literally, except that sign idioms were scored as such. Applying English "gloss" to the productions of the English-fluent deaf students was relatively straightforward because of their frequent use of English structure and functors. This was more difficult with those of the ASL-oriented subjects.

these translations were done sign-for-sign, omitting functors and auxiliaries unless explicitly signed. Directional (implied pronoun) signs (e.g., PAST-I-GIVE-YOU...) were glossed as they would be spoken (I GAVE YOU).(2)

Transcripts and videotapes were then examined for non-literal constructions by the authors, who are both native English speakers (with training in linguistics) and advanced but non-native signers. Unfamiliar, non-literal sign sequences were discussed with native signers to determine whether they they were regular ("frozen") occurrences in sign language or novel constructions. In the course of examining the signed stories, six distinct categories of non-literal constructions emerged. Listed in Table 1, these encompassed all constructions scored as non-literal in the deaf students' stories. When subsequently applied to the hearing students' stories, all categories were found relevant (i.e, had at least 3 scored exemplars each) and all non-literal constructions were accounted for. The appropriateness of the categories for the hearing students' stories was particularly important, because no previous studies have attempted to fully classify the kinds of non-literal language devices used in oral production. Although children's spontaneous language has been examined with regard to the occurence of metaphor and simile (e.g., Winner, 1979), these account for only a small fraction of the total non-literal language observed.

Two of the scoring categories were the classes of <u>novel</u> and <u>frozen</u> figurative language or <u>trope</u> frequently observed and investigated in written prose. In the <u>novel trope</u> category, several traditional figurative devices were classified, based on descriptions by Barlow, Kerlin, and Pollio (Note 2). The particular types of constructions actually observed and scored (for both deaf and hearing) included metaphor - implicit comparisons between two dissimilar domains, simile - explicit comparisons between two dissimilar domains, and metonymy/synecdoche (scored as a single type) - using an attribute or associate

of something to represent the whole. Anthropomorphism in service of the "metamorphosis" story was not scored, and onomatopoeia was scored in a different category below. Constructions scored in the frozen trope category included spoken figures like "I found my footing," and signed figures like BEING-BORED (signed by repeatedly waving the left forefinger toward the mouth and the right forefinger toward the right ear), which at one time would have been novel but now have become part of their respective vernaculars.

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Insert Table 1 about here

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Three other categories (gesture, pantomime, and linguistic modification) involved constructions that cannot occur in printed media. Gesture included what could be considered frozen pantomime: ritualized body movements that conveyed meaning or affect, such as beckoning someone with a wave of the hand, or making a "Shh!" gesture with the forefinger in front of the lips. Pantomime included all novel (non-gestural) uses of body movement conveying literal or affective meaning. Iconic (traditional) signs were not scored here, nor were vocal sound effects.(3) The category of linguistic modification included alterations of signs (other than noun and verb inflections; see Klima & Bellugi, 1979) that altered the meaning of the unit or provided extra information. For the hearing subjects, this included onomotopoeia, sound effects, and other vocal modifications like switching to a creaky voice to indicate an elderly speaker, and drawing out the word "huge" ("huuuuuge") to convey excessive size. For the deaf subjects, this included iconic sign modifications such as repeatedly moving the sign CHAIR away from the body to

denote rows of chairs in an auditorium, and making the sign TREE with each arm and moving them alternately past the head to denote walking through a forest.

The last category linguistic invention, while appropriate for written prose, has not been documented previously. It included novel linguistic constructions (i.e., not pantomime) that while not currently part of the language were understandable "place holders" for particular (usually new) ideas. Hearing subjects produced inventions like alusinium ("the most valuable mineral in the universe") and dogway (the animal equivalent of Broadway, where The Talking Human was brought to make a fortune for his dog agent). Deaf subjects produced inventions like the representation of LITTLE-EYED-PEOPLE who populated the center of the earth and DEEP-DIRT, the name of the underground world (both of which previously had been literally described indicating intentional figurative use; Mendelsohn, Robinson, Gardner, & Winner, in press).

Since the scoring categories were derived jointly by the authors, assessment of their inter-rater reliability was inappropriate. Instead, an external check on scoring reliability for the signed stories was made by a native signer, different from the one who initially interpreted the videotapes, but also a nationally certified professional interpeter. He was shown a randomly selected subset of approximately 50% of the constructions scored as figurative by the authors, together with a randomly selected, equal number of constructions not scored as figurative. His scoring yielded 83% agreement on the literal/non-literal dimension and 95% agreement in scoring non-literal sequences according to the categories listed in Table 1. Importantly, 71% of the literal/non-literal disagreements resulted from the authors' not scoring a sequence the native signer felt to be figurative. The data presented below thus are likely to be somewhat conservative.

The videotapes of the hearing subjects were transcribed word-for-word by one of the authors and an assistant; all gestures, body movements, and "sound effects" in any way related to the stories also were recorded. A check on scoring reliability by the other author provided over 90% agreement.

Story Production. Overall, deaf and hearing subjects produced stories of comparable mean lengths (677 and 635 transcribed words/story, respectively, $p>.20$, by a sign test). There were large individual differences among the deaf subjects, however, as they produced stories of mean lengths (by increasing age) 1284, 623, 524, and 282 gloss-words.

The frequencies of creative constructions (per 100 transcribed words) classified within the six scoring categories are shown in Table 1, collapsed over story. Clearly, the deaf subjects produced relatively more figurative language than their hearing peers across the six scoring categories, $p<.01$, by a Wilcoxon signed-ranks test. Considering each scoring category separately, the deaf subjects surpassed their age-matched hearing peers in all but novel trope and frozen trope, all other p's$<.05$, by sign tests.

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Insert Table 2 about here

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As noted above, the deaf (as well as the hearing) subjects produced constructions classifiable as metaphor, simile, and metonymy/synecdoche. These results are particularly important because they indicate the traditional forms of English "figures of speech" to be in the language repertoires of the average deaf child (see also, Iran-Nejad et al., 1981). Contrary to conclusions from

studies involving the comprehension of English trope, the deaf subjects here demonstrated figurative competence in sign language production at a level comparable to that of hearing peers within English.

The deaf subjects' higher frequencies of gesture (e.g., "Shh," beckoning) and pantomime, two non-linguistic creative devices, may not appear surprising. However, this was primarily attributable to the two ASL-oriented subjects, who produced 98% of the total in each category. Two of the hearing subjects similarly accounted for 82% of their group's gesture and 92% of their pantomime. The remaining deaf and hearing subjects did not differ reliably in either category. Thus, while these devices, a priori, might be expected to be used more frequently by all deaf subjects, they actually seem more a matter of language orientation or idiosyncratic preference. Interestingly, deaf children can incorporate signs into pantomime (e.g., one of our subjects "ran into" the sign TREE), a creative device not matched by any available to their non-signing peers.

It might be argued that the superiority of deaf subjects in the category of linguistic modification could be attributed to such modifications being a more integral part of sign language, and especially ASL, than of English. In fact, the ASL-oriented subjects surpassed all others in the frequency of such changes. The traditional tropes described above, however, have been considered an integral part of English (Ortony, 1975; Petrie, 1979), and the deaf also were competent there. More centrally, even if there are creative aspects of sign without exact English equivalents, this would seem to support the not unsurprising conclusion that deaf children have creative language abilities not tapped by English testing (Kaltsounis, 1970).

True linguistic invention seems the zenith of creative language skill, and both deaf and hearing subjects here produced such novel units (.10 versus .04 per 100 words, respectively). The most interesting finding, however, was that only the deaf subjects re-used their inventions (at a mean rate of .59 times per 100 words). This suggests differences in deaf and hearing individuals' use of linguistic invention beyond the observed difference in the number of different inventions.

One other finding from this study is worthy of note, although the sample sizes were too small to draw any strong conclusions. When the data for the ASL-oriented and English-fluent subjects were examined separately, the ASL-oriented subjects were significantly more figurative than the hearing subjects (p's<.05, by sign tests) in all categories except novel and frozen figures, where they were slightly inferior. The English oriented subjects were below both ASL-oriented and hearing subjects in their use of gesture and pantomime and were intermediate with respect to them in their use of formational modification of linguistic units and linguistic invention. These findings suggest that the ASL-oriented deaf person is quantitatively and qualitatively different in their linguistic (and perhaps cognitive) flexibility than those fluent in English. Further support for this conclusion has been obtained from other studies investigating the spatial, sequential, and kinesthetic components of sign language comprehension in adults and children (Marschark & Rucker, Note 3; see also Hung, Tzeng, & Warren, 1981; Shand, 1982).

Conclusions

The present results indicate that deaf school children are not necessarily tied to concrete/literal language when using sign language, even if they may be when using English (Conley, 1976; Conrad, 1979). Whether or not one wishes to consider several of the present scoring categories as truly "figurative," (a problem encountered with oral as well as signed productions), the deaf adolescents examined here did possess creative and flexible language skills not typically ascribed to the deaf school child (Furth, 1973; Liben, 1978; Tervroot, 1961). Further, to the extent that figurative language requires both abstractive mapping of attributes between conceptual domains and meta-linguistic awareness, our sample of deaf school children was at least as capable as their hearing counterparts.(4) Evaluating the linguistic and cognitive skills of deaf school children in terms of English thus underestimates their abstractive linguistic and cognitive abilities.

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Footnotes

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(1) Although most relevant studies available to the authors have involved English, the term is used generically here for all vocal languages (but see, e.g., Tervroot, 1961).

(2) Transcriptions of signs or signed sequences (English gloss) are in capitals. In some cases these are only approximate, where complete translation of a figure would have been difficult and inflated word counts.

(3) Gestural and pantomimic sequences were scored as a single construction unless separated by pauses, changes in signer orientation (indicating change of actor), or explicit separators (e.g., FINISH).

(4) While there is still considerable debate concerning the locus of figurative language abilities (see Marschark et al., 1983, for a review) and their bases in younger children, figurative language competence is acknowledged to entail more complex linguistic and cognitive abilities than literal competence (see, e.g., Vosnidou & Ortony, 1983).

Table 1

Scoring Categories of Creative Language

in Signed and Oral Production

1. Tradional, Novel Trope (e.g., metaphor, simile, metonymy)
2. Frozen Trope
3. Gestures ("frozen pantomime")
4. Pantomime
5. Linguistic Modification (e.g., formational modifications of signs, dialect or register change in speech)
6. Linguistic Inventions (creation of new signs or words or expressions)

Table 2

Frequency of non-literal constructions per 100 transcribed words

Scoring Category	Deaf	Hearing
Novel Trope	.39	.25
Frozen Trope	.13	.06
Gesture	.79*	.22
Pantomime	3.50*	.25
Linguistic Modification	.63*	.20
Linguistic Invention	.68*	.04

* Difference reliable, $p<.05$, by sign test.